N92-12836

Imaging Studies of Comets

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Strategy

The Joint Observatory for Cometary Research (JOCR) is administered on a NASA/GSFC contract with New Mexico Institute of Mining and Technology (NMIMT). JOCR's historical mission has been to provide understanding of large-scale interactions between bright comets and solar wind using wide-angle (Schmidt) imagery and spacecraft data; in this pursuit the JOCR has excelled. The 16" Newtonian/Cassegrain telescope has been upgraded (cf. b.) to permit filtered-, narrow-field CCD imaging of both bright and faint comets. Thus, to JOCR's original mission has been added the goal of obtaining narrow-band imagery of the near-nuclear region of bright comets, with emphasis on ionisation processes and total gas production. A 300mm lens/CCD system exists with 2 degree FOV and the use of comet filters; this system bridges the gap between the wide-field (8x10 deg.) Schmidt plates and the several-arcmin. field of the 16" telescope. JOCR is located under dark skies on South Baldy mountain (el. 10,600 feet) near Socorro, NM, and is one of the last truly dark sites in the continental U.S.

Progress and Accomplishments

Dr. D. Westpfahl has assumed the JOCR leadership role for NMIMT, and is working with Drs. D. Klinglesmith and M. Niedner in upgrading the facility and developing plans for future cometary observations. The comets Austin and Levy campaigns were successful, particularly the Austin run with the filtered 300mm/CCD system. Hundreds of dataframes taken in H_2O^+ (6205A) were obtained, and the best sequences on active nights were converted to video (movie) format. The development of DEs and folding tail rays are shown in great detail and are being analyzed. The 16" Newtonian/Cass. telescope has been converted optically to f/5 operations, and is now under computer control with tracking in two axes. Cometary filters for C2, H20+, cont., etc. emissions are on hand for the 300mm lens and 16" CCD systems. A sensitometer for calibration of Schmidt plates was obtained on loan from KPNO.

Projected Accomplishments

Data from the Austin and Levy observing runs will be further scrutinized, as solar-wind and IMF data for 1990 will soon be available to add to the analysis already performed. Other comets of opportunity, including faint comets, will be observed to the maximum extent possible.

Publications

Klinglesmith, D. A., Niedner, M. B., and Shore, S. 1988, "A solar wind-induced extreme ion tail disturbance in comet Bradfield 1987", Bull. Am. Astrom. Soc., 20, 732.

Klinglesmith, D. A., Niedner, M. B., Oliversen, R. J., and Westpfahl, D. 1990, "A tail wagging event in comet Austin", AAS Comet workshop, 1990 June 15-16, p. 128.

Delva, M., Schwingenschuh, K., Niedner, M. B., Gringauz, K. I. 1991, "Comet halley plasma tail observations & in situ solar wind properties", Plan. Sp. Sci., in press.